

List of the North American species of **BOMBUS** and **APATHUS**.

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The great difficulty that has attended the discrimination of the European Bombi, on account of the many variations, will doubtless be experienced with our own species, until a correct knowledge of them is obtained. A mere examination or comparison of the specimens will not surmount this difficulty,—their haunts must be examined, and the only way in which the species and their varieties can be correctly separated, is either by capturing or breeding the individuals from their nests. As yet no such information has been obtained of our species, and to make a beginning, we must do the best we can in separating them by examining and comparing specimens, until we obtain by experience such knowledge as will enable us to produce a correct division of these insects. It is my purpose, therefore, in this paper, to give a list of our species with their characters, together with a few notes which may be of service to future monographists of this group.

Gen. **BOMBUS** Latr.

*Bombus* Latr. Hist. Nat. Ins. xiv, 63. (1802).

*Bremus* Jurine, Hym p. 259. (1807).

The latest, best and most detailed description of the characters of this widely distributed genus, is thus given by Mr. Smith, in his *Catalogue of the Bees of Great Britain*, (p. 207):—

“*Body* oblong and densely pubescent. *Head* subtriangular. *Antennæ* geniculated, filiform, longer than the head. *Ocelli* placed in a slight curve in a transverse impression on the vertex. *Labrum* transverse, its anterior margin ciliated. *Mandibles* stout, grooved exteriorly towards their apex, which is rounded. *Labial palpi* four-jointed; the first joint elongate, longer than the mentum, the second joint about one-fourth as long as the first, ciliated at the sides; the third and fourth joints minute, placed outside and near the apex of the second joint. *Paraglossæ* short, broad, and rounded at their apex. *Labium* linear, very pubescent, and about one-third longer than the labial palpi. *Maxillary palpi* two-jointed. *Superior wings* with one marginal and three submarginal cells, the second submarginal cell much narrowed towards the marginal, receiving the first recurrent nervure about the middle; the third submarginal narrowed towards the marginal, receiving the second recurrent nervure near

its apex. *Posterior legs* in the *females* have on the upper and under margins of the tibiæ externally, a dense fringe of stiff hairs, forming a corbicula or pollen-basket; the exterior surface of the tibiæ smooth, shining, and broadly dilated; the basal joint of the tarsi elongate, broad, flattened, and slightly concave exteriorly, deeply notched at the base, forming a stout tooth; the exterior margins ciliated with short stiff hairs; the claws bifid. In the *males* the tongue is more elongate and slender; the mandibles have a dense fringe of curled hair on their inferior margins; the antennæ are more slender, and longer; the posterior tibiæ are not furnished with a corbicula, and are slightly thickened; the basal joint of the posterior tarsi not notched at the base; the abdomen has an additional segment, and the antennæ an additional joint."

The difference in the shape of the posterior tibiæ and first joint of the posterior tarsi of the males, will more easily distinguish it from the female sex, as it is often troublesome to count the joints of the antennæ and the segments of the abdomen; but a very conspicuous character with which to distinguish the sex, and for which, apparently original, observation, I am indebted to Benj. D. Walsh, Esq., of Rock Island, Ill., is the difference in the shape of the tarsal claws:—in the male the inner tooth of the claw is almost as long as the outer, while in the female and worker the inner tooth is very short. This character, as far as I have observed, is constant.

Between the *female* and the *worker*, there seems to be no external characters, excepting size, by which to distinguish them, the worker being the smallest, and yet in a large series of some of our common species, the size gradually diminishes from the largest female to the smallest worker, making it quite impossible to divide them without more explicit characters. However, as there seems to be some confusion of opinion amongst authors, regarding the difference in size between the females and the workers, and in the absence of any satisfactory solution of the matter, it may be interesting to cite here a few passages on this subject. Reaumur (Ins. vi.) says:—"The nests seldom contain more than 50 or 60 inhabitants; these are of different sizes: the females, of which there is more than one in a nest, are the largest, and probably alone survive the winter; the males are of the middle size, as is also one description of working-bees, or neuters; the other neuters are the smallest, no bigger than the hive bee. These two sorts of neuters, it is most likely, are appropriated to different kinds of work; the largest being the strongest, and the others the most lively, active and expert." Huber (Trans. Linn. Soc. Lond. 1802, vi, p. 218) says:

“The males of Bombi are always smaller than their females; the difference is greater or less according to the species; in some, the females are at least double the size of the males, in others they are only a few lines longer. The size of the males and the females scarcely varies in each species, but the workers have not so fixed and uniform a size; some are so small that they would not be taken for Bombi; others are so large that one would be tempted to take them rather for females than for workers; nevertheless their size is never equal to that of the mothers, and a glance of the eye is sufficient to compare them, and to put each one in the place which it ought to occupy.” Again, on p. 284, he says:—“The form of the maxillæ of the female is entirely like that of the worker; its legs are equally capable of being charged with pollen, the colors of both are generally distributed in the same manner upon all parts of the body; it appears, that if to so many relations, we add that of fecundity, we shall make of the workers as many small females; for the difference of size is the only exterior character by which they can be distinguished.” And again, on p. 290, he says:—“Among the workers there were assuredly small females, which I should have recognized, if I had been able to find in them any distinctive character.” St. Fargeau (Hym. i, 448) says:—“When the birth of a certain number of workers has made the work more easy, and the arrival of provisions more active, comes the period when the Mother Humble-Bee lays eggs of males and at the same time eggs of females. These females, at least some of them, acquire a size much above that of the mother, founder of the nest. They are in this respect intermediate between the latter, and the small barren workers, which first came into the world. Like the workers they share in the common labors, and, like their mother, they become fecundated by connection with the males born at the same period as themselves. These males are also smaller than the males which will be born at the end of the summer. \* \* \* \* Then the population increases in proportion to the number of these young females, of medium size, which have just been hatched; the number of males especially appears to increase rapidly, which would lead me to believe that they gave birth to males only. The female founder continues nevertheless her laying, and, towards the end of August, there are raised, in each nest, several females of the largest size (from three to eight, as far as I have been able to see). It is these

which will pass the winter, benumbed by the cold, and which are destined to the subsequent propagation of the species in the following year."

Thus it seems that Reaumur and Huber consider all workers, except the largest females, while St. Fargeau seems to think that all are females except the smallest, which he calls the workers.

The opinion of St. Fargeau is probably the most correct, although there is no doubt that the workers vary in size as well as the females. An examination of the sexual organs, however, may show some differences of structure between the two sexes.

Our species of *Bombus* are quite numerous, and many of them very handsome.

The following table may facilitate the determination of the species:—

\* *Thorax above entirely yellowish.*

§ Abdomen yellowish and black.

† *Apex black.*

1st segment yellow.....	Sp. 1—2.
2d segment yellow.....	Sp. 3.
1st and 2d segments yellow.....	Sp. 4.
1st, 2d and 3d segments yellow.....	Sp. 5.
Mixed with black and yellow.....	Sp. 6.

†† *Apex yellowish or whitish.*

First 3 segments yellow.....	Sp. 7.
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§§ Abdomen entirely yellowish-white in certain lights.....Sp. 8.

\*\* *Thorax above yellowish, banded with black.*

§ Abdomen whitish or yellowish and black.

† *Apex black.*

First 5 segments yellow.....	Sp. 9.
“ 4 “ “ .....	Sp. 10—11.
“ 3 “ “ .....	Sp. 12—13.
“ 2 “ “ .....	Sp. 14—16.
Third segment yellowish.....	Sp. 17.
Fourth “ “ .....	Sp. 18—19.

†† *Apex white or yellowish-white.*

First 3 segments black, remainder white.....	Sp. 20.
1st, 2d and 4th segments black.....	Sp. 21.
1st, 3d and 4th “ “ .....	Sp. 22.
1st, 4th and 5th “ “ .....	Sp. 23.
1st and 4th “ “ .....	Sp. 24.

§§ Abdomen yellow, reddish or fulvous and black.

† *Apex yellowish or fulvous.*

3d, 4th or 5th segments black.....Sp. 25—29.

†† *Apex black.*

1st and 2d segments yellow and reddish; rest black.....Sp. 30.

1st segment yellow, 2d, 3rd and part of 4th reddish.....Sp. 31.

1st and part of 4th segments yellow, 2d and 3rd reddish.....Sp. 32.

“ “ “ “ 2d, 3d & part of 4th reddish.....Sp. 33.

1st and 4th segments yellow, 2d and 3rd reddish.....Sp. 34.

1st and 2d segments yellow, 3rd and 4th reddish.....Sp. 35.

§§§ Abdomen entirely yellowish or reddish, or both.

Anterior half yellow, posterior reddish.....Sp. 36.

2d and 3rd segments reddish.....Sp. 37.

3d and 4th “ “ .....Sp. 38.

All yellowish except anus.....Sp. 39.

\*\*\* *Thorax above black.*

Abdomen with the first 3 segments more or less yellow or red Sp. 40—42.

“ reddish, except the 1st and last segments.....Sp. 43.

“ all black.....Sp. 44.

#### 1. *B. Virginicus.*

*Apis Virginicus* Oliv. Encycl. Méth. Ins. iv, p. 66. (1789).

? *Apis griseo-collis* De Geer, Mém. Ins. iii, p. 576, pl. 28, fig. 13—14. (1773); Oliv. Encycl. Méth. Ins. iv, p. 64. (1789).

*Bombus Virginicus* Fabr. Syst. Piez. p. 346. (1804); St. Farg. Hym. i, p. 470. (1836); Kirby, Faun. Bor. Am. iv, p. 274. (1837); Smith, Brit. Mus. Cat. Hym. ii, p. 398. (1854); Greene, Ann. Lyc. Nat. Hist. N. Y. vii, p. 170. (1860).

*Female.* Head black, clothed more or less with yellowish hairs above the antennæ. Thorax above and on the sides pale yellow, more sparse on the disk. Wings vary from sub-hyaline to violaceous. Legs black, except the base of the femora beneath which is sometimes clothed with yellowish hairs; tarsi brown, basal joint rufous on the inner side. Abdomen with the first segment above pale yellow, remaining segments black; sometimes the anterior margin of the second segment in the middle, is sparsely clothed with short yellowish hairs. Beneath black. Length 9—12 lines.

*Worker.* Differs from the female only in size, and undergoes the same variations in color. Length 5—7 lines.

*Male.* Head clothed above and below the antennæ with yellowish, intermixed with a few black hairs; eyes very large and prominent.

Thorax above and on the sides tawny-yellow. Wings subhyaline, more or less embrowned. Legs black; femora beneath clothed with long yellowish hairs. Abdomen with the first segment above yellowish; anterior part of the second segment in the middle yellowish or yellowish-brown; remaining segments black. Beneath black, more or less mixed with yellow. Length 7—9 lines.

A very common species. Fifty (18 ♀, 24 ♂, 8 ♂) specimens examined. Can., Conn., N. Y., Del., Pa., D. C., Ill., Mo., Miss., Tex. (Coll. Ent. Soc. Phila., and Mr. E. Norton.)

I have with some doubts placed De Geer's *Apis griseo-collis* as a synonym of this species. De Geer says:—"The Bees of this species, which are of a medium size and very hairy, although less upon the abdomen than elsewhere, have been found in Pennsylvania by M. Acrelius, where they make their nests in the ground. I have only the workers and the males. Their color is black, but the thorax and a part of the anterior portion of the abdomen are entirely covered with hairs of a yellowish-gray, or olive color. The wings are brown and shining, and the eyes of a dusky brown. The male is large, with large eyes which cover almost the whole of the head, as is usual in all the male Bees. The upper lip is yellow, and the black color of the abdomen and of the legs is shining, and approaches somewhat a deep blue. The working Bee, which is of the usual form of the Humble-Bees, is much smaller than the male; its upper lip is black like the rest of the head, and the black color of the abdomen and of the legs has no blue shade." The figure given by De Geer, of his species, represents the abdomen as being entirely black. Olivier seems to have seen De Geer's species, and thinks it distinct from his *Apis Virginica*, previously described. Therefore, if *griseo-collis* and *Virginicus* should prove to be the same species, which is quite probable, then the former name must, according to priority, take precedence.

In defence of the synonymy of *B. Virginicus*, given above, I have to say, that the briefness of the Linnean and Fabrician descriptions of *Apis Virginica* are such, that it is impossible to say, with any degree of certainty, whether they refer to our common *Bombus Virginicus* or *Xylocopa Virginica*, both species having the thorax and basal segment of the abdomen yellowish. In 1770, Drury described and figured (Illust. Ins. 1, p. 96, pl. 43, fig. 1) a species, without name, which, according

to the description and figure, is certainly our common *Xylocopa* or carpenter-bee. During the next year, Linnæus, in his "Mantissa Plantarum," gives Drury's species the name of *Apis Virginica*, and describes it thus:—"hirsuta pallida, abdomine, excepto primo segmento, atro." Fabricius, in his Syst. Ent., and Ent. Syst., and Gmelin, in ed. Linn. Syst. Nat., give the same description of *Apis Virginica*, quoting Drury's description and figure, and as if they had not seen the insect. they give no additional characters, and we are, therefore, obliged to give these quotations as referring to *Xylocopa Virginica*. Olivier, in Encycl. Méth. (1789), although he quotes all former descriptions of *Apis Virginica*, gives us in a very few words, the first indication of the existence of *Bombus Virginicus*, having, no doubt, had that species before him when he wrote his description, because he says that *the head is black, with a few yellow hairs in front*, which is the case with the *Bombus*, but not with the *Xylocopa Virginica*. In 1804, Fabricius in his Syst. Piez. creates the genus *Bombus* and places Drury's species in that genus; he also describes under the genus *Centris*, a species which he calls *Carolina*, and which is nothing more or less than the same species as described by Drury. We are then to suppose that his *Bombus Virginicus* is the *Apis Virginica* of Olivier, and not of Drury and Linnæus, whom he quotes. Mr. Say, in Bost. Journ. (1837), doubting the accuracy of Fabricius in placing his *Carolina* in the genus *Centris*, made an examination of the generic characters and found it to be a *Xylocopa*, a genus created by Fabricius in the same volume in which he describes his *Centris Carolina*. Mr. Say gives a description of both sexes of this species, but allows it to retain the name of *Carolina*, and quotes Drury's *Virginica* (which was described over 30 years before) as a synonym. Mr. Westwood, in his new edition of Drury's work (1837), transfers the *Apis Virginica* of Drury to the genus *Xylocopa*, and quotes Fabricius' *Bombus Virginicus*, Syst. Piez., as the same thing. Finally, Mr. Smith, in his British Museum Catalogue of Hymenoptera, ii, p. 362 (1854), quotes both Drury's and Fabricius' species as distinct; to the former he gives the same references as he gives to *Bombus Virginicus* on p. 398, and indicates that both *Xylocopa Virginica* (Drury), and *Xylocopa Carolina* (Fabr.), as distinct species, are in the Collection of the British Museum. Amid all this confusion, our only course is to fall back on what little proof we

have, and transfer all references of *Apis Virginica*, previous to that of Olivier, to *Xylocopa*, and place the discovery of *Bombus Virginicus* to the credit of Olivier, who gave the first indication with which we are able to separate it from the *Apis Virginica* of Drury, Linnæus and Fabricius. Therefore, I offer the following as, probably, a more correct view of the synonymy of the latter species.

*XYLOCOPA VIRGINICA.*

*Apis Virginica*. Drury, *Illust. Exot. Ins.* i, p. 96, pl. 43, f. 1 (1770); Linn. *Mant. Plant.* p. 540. (1771); Gmelin, ed. Linn. *Syst. Nat.* p. 2784; Fabr. *Syst. Ent.* p. 380. (1775); *Ent. Syst.* ii, p. 318. (1793).

*Centris Carolina* Fabr., *Syst. Piez.* p. 357. (1804).

*Xylocopa Carolina* Say, *Bost. Jour.* i, p. 412. (1837); St. Farg., *Hym.* ii, p. 207. (1841); Smith, *Brit. Mus. Cat., Hym.* ii, p. 363. (1854).

*Xylocopa Virginica* Westw., edit. Drury, *Illust. Exot. Ins.* i, pl. 43, fig. 1. (1837); Smith, *Brit. Mus. Cat., Hym.* ii, p. 362. (1854).

2. *B. impatiens.*

*Bombus impatiens* Harris, *Cat. Ins. Mass.* 2d edit.

*Male.* Head black, with a mixture of yellowish hairs below the antennæ and on the cheeks and vertex. Thorax pale yellowish. Wings hyaline. Legs black, with pale hairs at base of the femora beneath. Abdomen with the first segment above pale yellow; remaining segments black. Beneath sparsely clothed with yellowish hairs. Length 7 lines.

*Female* and *worker* not seen.

Seven specimens. Can., Conn., Pa., Ill., Mo. (Coll. Ent. Soc. Phil., and E. Norton.)

The coloration of this species is so much like that of *B. Virginicus*, that, at first, I supposed it to belong to that species, but the males above described are so different from what I have taken for the males of *B. Virginicus* that they can scarcely be of the same species. A specimen in the collection of Mr. Norton, labelled *B. impatiens*, was compared with specimens so named in the Harris collection, and the above description made from it. It may be that this species and the males of *B. Virginicus* are mixed up, but until we have more conclusive evidence of their identity, it is probably best to keep them separated.

3. *B. Marylandicus.*

*Apis Marylandica* Fabr. *Ent. Syst. Suppl.* p. 273.

*Bombus Marylandicus* Fabr. *Syst. Piez.* p. 346.

“Large. Head black, labium ferruginous. Antennæ black, first



article ferruginous. Thorax hairy, ferruginous. Abdomen hairy, black, second segment yellow. Posterior legs very hairy. Wings blackish-violaceous. *Hab.* America."

Unknown to me. Is it a *Bombus*?

4. *B. vagans*.

*Bombus vagans* Smith, Brit. Mus. Cat. Hym. ii, p. 399.

*Female.* Head black, often more or less yellow on the vertex. Thorax above and on the sides yellow, sometimes slightly intermixed with black between the wings. Wings fusco-hyaline. Legs black; in some specimens the base of the femora below have a few yellowish hairs; tarsi brown. Abdomen with the first two segments above yellowish, remaining segments black, except in two specimens which have the apical segment slightly mixed with yellow. Beneath black. Length 8—12 lines.

*Worker.* Colored as the female. Length 6—7 lines.

*Male.* Head yellowish, slightly mixed with black, with a thick tuft of bright yellow in front below the antennæ. Thorax above and on the sides pale yellow. Wings subhyaline, faintly clouded on the apical margins. Legs black; femora clothed beneath with yellowish hairs. Abdomen with the first two segments above pale yellow; remaining segments black, except the apical one, which is sometimes mixed with yellowish. Beneath clothed with yellowish hairs. Length 6—8 lines.

Forty-two (14 ♀, 19 ♂, 9 ♂) specimens examined, from various localities:—Can., Me., Conn., Pa., N. J., Del., D. C., Va., Ill. (Coll. Ent. Soc. Phil. and E. Norton.)

5. *B. perplexus* n. sp.

*Male.* Head black, with a tuft of pale hairs in front below the antennæ; vertex yellowish. Thorax bright honey-yellow. Wings hyaline, apical margins faintly clouded. Legs black; base of femora beneath yellowish. Abdomen with the three basal segments bright honey-yellow, the third segment having a slight admixture of black; remaining segments black. Beneath black, slightly mixed with yellowish. Length 8 lines.

*Female* and *worker* not seen.

One specimen. Connecticut. (Coll. Mr. E. Norton.)

This species closely resembles *B. Hudsonicus*, but the form of the

body is more elongate and not so compact as that of the latter species, and the color is much brighter.

6. **B. bimaculatus** n. sp.

*Male.* Head black, mixed with yellowish on the face and vertex. Thorax honey-yellow. Wings sub-hyaline, slightly stained with yellowish. Legs black, clothed with yellowish hair, especially on the femora beneath. Abdomen with the whole of the first segment above, and the second, except a few black hairs on the middle and a round black spot on each side, pale honey-yellow; the fourth segment mixed with black and yellow; the third and apical segments black. Beneath yellowish hairy. Length  $7\frac{1}{2}$  lines.

*Female* and *worker* unknown to me.

One specimen. Connecticut (Coll. Mr. E. Norton.)

7. **B. Hudsonicus**, n. sp.

*Male.* Head with a tuft of yellow hairs in front and on the vertex. Thorax above and beneath yellowish. Wings subhyaline. Legs black, femora beneath clothed with yellowish hairs. Abdomen with the first three segments yellowish above; the remaining segments black, the two apical segments having a mixture of pale hairs. Beneath sparsely clothed with yellowish hairs. Length 7 lines.

*Female* and *worker* not seen.

Two specimens. Hudson's Bay Territory. (Coll. E. Norton.)

8. **B. pallidus** n. sp.

*Female.* Head black, with fuscous hairs at the insertion of the antennæ and on the vertex. Thorax above and beneath pale ochraceous, shading into pale fuscous posteriorly. Wings dark fuscous, tinged with violaceous. Legs black, thickly clothed with short pale hairs; tarsi pale, inner side of basal joint golden in certain lights. Abdomen above pale ochraceous, base of the first, and the three apical segments shaded into pale fuscous. Beneath black, sparsely clothed with short pale hairs. Length 11 lines.

*Worker* and *male* not seen.

One specimen. St. Louis, Mo. (Coll. E. Norton.)

In taking a dorsal view of this singular species, with the head turned from us, the upper surface of the thorax behind the insertion of the wings, the base of the first, and the three apical segments of the ab-

domen are pale fuscous. If we turn it around, with the head towards us, this color disappears, and the whole surface seems to be pale ochraceous with a silky gloss. In examining this specimen, it occurred to me that it might be a very faded specimen of our common *B. Pennsylvanicus*, for if we convert the pale fuscous into black, and the pale ochraceous into yellow, we will have the exact coloration, superiorly, of that species; but the hairs of the legs being pale ochraceous, and with the sericeous appearance of the insect, would be sufficient, in my estimation, to render it distinct, and it would scarcely be possible for the colors to change so greatly, particularly so, as the specimen, apparently, has never been in spirits.

9. *B. borealis*.

*Bombus borealis*, Kirby, Faun. Bor. Amer. 4. p. 272.

“Body clothed underneath with black, above with tawny hairs. Face and vertex with a tuft of yellowish ones; thorax, between the wings, with a black hairy band; wings somewhat embrowned, with black nervures; legs black; abdomen above with a thick coat of tawny hairs palest at the base; anus black. Length of body 8 lines. Taken with *B. sylvicola*.”

In the collection of the Entomological Society there is a single female specimen from Canada (kindness of Mr. Saunders), which answers to the above description, except that the abdomen beneath is sparsely clothed with yellowish hairs, and the length of the body is 9 lines. I do not feel justified in separating them.

10. *B. fervidus*.

*Apis fervida* Fabr. Ent. Syst. Suppl. p. 274.

*Bombus fervidus* Fabr. Syst. Piez. p. 352; St. Farg. Hym. 1, p. 470.

*Female*. Head black. Thorax anteriorly and pleura yellow; a black band between the wings. Scutellum yellow. Wings fusco-hyaline, slightly tinged with violaceous. Legs black. Abdomen above yellow, excepting the two apical segments which are black. Beneath black. Length 10 lines.

*Variety*. The yellow color deeper, the black band between the wings is broader, and the face and vertex is clothed with pale yellow hairs.

*Worker*. Colored same as the female. Length 6—7 lines.

*Male*. Head yellow in front and on the vertex. Thorax above tawny-

yellow, mixed with black on the pleura; a broad black band between the wings. Wings subhyaline. Legs black, slightly mixed with yellowish on the femora beneath. Abdomen with the first four and the posterior margin of the fifth segments above tawny-yellow, the remaining segments black. Beneath yellowish. Length 7 lines.

Twenty-seven (14 ♀, 10 ♂, 3 ♂) specimens examined. Can., Conn., N. Y., Penn., Del., Va., Ks., and Utah. (Coll. Ent. Soc. Phil. and E. Norton)

I have seen no specimens so large as mentioned by St. Fargeau,—13 lines.

#### 11. *B. Pennsylvanicus*.

*Apis Pennsylvanica* De Geer, Mém. iii, p. 575, pl. 28, f. 12. (1773).

*Apis Americanorum* Fabr. Syst. Ent. p. 380. (1775); Ent. Syst. ii, p. 319. (1793); Oliv. Encycl. Méth. iv, p. 66. (1789).

*Bombus Americanorum* Fabr. Syst. Piez. p. 346. (1804); St. Farg. Hym. i, p. 472. (1836).

*Female*. Head black, often more or less yellow on the vertex. Thorax with its anterior portion above yellow; between the wings black. Scutellum black, generally mixed with yellow. Wings blackish-violet. Legs black; tarsi brown, basal joint rufous on the inner side. Abdomen with the first segment above generally more or less yellow, sometimes almost all black; second and third segments yellow, remaining segments black. Length 9—12 lines.

*Worker*. Differs in no respect from the female, except in size; in color it undergoes the same variations. Length 6—8 lines.

*Male*. Head black, intermixed with obscure yellowish on the face and vertex; eyes very large and prominent, almost contiguous on the vertex. Thorax above and on the sides tawny-yellow, with a blackish band between the wings; in some specimens the thorax is entirely yellowish. Wings fusco-hyaline, darkest along the costa and towards the base. Legs black; hairs of the basal joint of the posterior tarsi pale; tarsi brown. Abdomen with the first three segments tawny-yellow, slightly mixed with blackish on the base of the first segment; remaining segments black. Beneath black, sparsely clothed with pale hairs. Length 10 lines.

Eighty specimens examined from Conn., N. Y., N. J., Penn., Del., Md., Va., Ill., Mo., Ks., Fla., Tex. (Coll. Ent. Soc. Phila., E. Norton.)

This is our most common species, and has generally been known

and cited by authors as the *Americanorum* of Fabricius, but De Geer described it two years previously under the name of *Pensylvanica*, as having the scutellum and the first segment of the abdomen all yellow, while that of Fabricius had those parts apparently all black. However, the series of specimens which I have examined show that they are one species, and that the color of the scutellum and the first segment of the abdomen vary very much in the mixture of black and yellow. The most abundant variety is intermediate between that of the De Geer and Fabricius, it having the scutellum and the first segment of the abdomen more or less mixed with yellow. Olivier was the only one who suggested that De Geer's species was a variety of *Americanorum*, and yet, for some unknown reason, he allowed the latter name to remain. No one since Olivier seems to have taken any notice whatever of De Geer's species, nor of Olivier in placing it as a synonym of *Americanorum*.

Two fine ♀ specimens from Florida vary in having the first segment of the abdomen above jet-black, with a small patch of yellowish in the middle of the posterior margin of the segment.

#### 12. *B. sonorus*.

*Bombus sonorus* Say, Bost. Journ. Nat. Hist. i, p. 413.

"Body yellow; head black; thorax with a broad black band in the middle; wings violaceous-black; tergum with the first, second and third segments yellow, with others black; beneath black. Length ♀ four-fifths of an inch. Inhabits Mexico."

"Resembles the *fervidus* Fabr., so closely that it may readily be mistaken for it, but that species has only two segments of the tergum clothed with yellow hair; that of the second one, however, is so much elongated as to conceal a considerable portion of the next segment. The color is a much deeper yellow than that of *fervida*."

Unknown to me. Say is certainly mistaken in stating that *fervidus* has only two segments of the abdomen yellow; it has the first four segments yellow.

#### 13. *B. Arcticus*.

*Bombus Arcticus* Kirby, Suppl. Parry's 1st Voy. p. cexvi. Curtis, Ross' 2nd Voy. Append. p. lxiv. (1824.)

? *Apis alpina* O. Fabr. Fn. Grœnland, p. 199. (1780.)

"*Female*. Body covered with long black hairs, but those that clothe

the base and apex of the thorax, and the anterior half of the upper side of the abdomen, are of a pale yellow. Some black hairs are visible at the base of the last yellow segment of this part of the body. The antennæ are as long as the head. The wings are a little tinged with brown, and their nervures are black. The tarsi are covered with short reddish hairs. Length 11 lines.

“*Male*. Much smaller than the female. The hairs of the whole trunk or intermediate segment of the body, are pale yellow intermixed with some black ones. The legs, also, particularly the anterior pair, are clothed with long yellowish hairs. Length 7 lines.”

Arctic America. Unknown to me.

Mr. Kirby gives his reasons, at some length, for considering this species identical with that of O. Fabr., who mistook his for the *Apis alpina* of Linné (See l. c. p. cexvii), and which species Mr. Smith (Bees of Great Britain, p. 222) quotes as a synonym of *B. nivalis* Dahlb., a species with the apical segments of the abdomen yellow, and consequently quite different from *B. Arcticus*.

#### 14. *B. pleuralis*.

*Bombus pleuralis* Nyl. Notis. ur Sällsk. pro Faun. et Flor. Fenn. Förh. 1. 231.

“♀. Black, thorax anteriorly and pleura yellow; scutellum and two first segments of the abdomen yellow. Length 20 millim.

“♂. Same as ♀ except that the hairs of the face are yellow; those of the belly mixed with yellowish, and those of the scutellum almost all black. Length 14 millim. Sitka.”

Not seen.

#### 15. *B. scutellaris* n. sp.

*Female*. Head black. Thorax with its anterior portion above and on the sides yellow; a broad black band between the wings. Scutellum yellow. Wings blackish-violaceous, darkest toward the base. Legs black. Abdomen with the two basal segments above yellow; remaining segments black. Beneath black. Length 13 lines.

*Worker*. Excepting size, there is no difference between this and the female. Length 9 lines.

*Male*. Not seen.

Four (2 ♀, 2 ♂,) Fla., Tex., (Coll. Ent. Soc. Phil., E. Norton, and Smith. Inst.)

This is a handsome species. It agrees with the description of *B. pleuralis* from Sitka, but besides its larger size, the difference of locality is so great that I have considered it safe to separate them.

16. *B. Groenlandicus*.

*Bombus Groenlandicus* Smith, Brit. Mus. Cat. Hym. ii, p. 393. 23.

“*Female*. Length 9—10 lines. Black; the pubescence on the face black, that on the vertex is also black; the face elongate. Thorax, above, anteriorly and posteriorly having a long loose yellow pubescence, between the wings a broad band of black; wings subhyaline, stained with fuscous towards their base; the legs have a black pubescence. Abdomen, the two basal segments covered with long yellow pubescence, the apical ones with black. *Hab.* Greenland.”

Not identified.

17. *B. medius* n. sp.

*Worker?* Head black. Thorax anteriorly pale yellowish, with a broad black band between the wings. Scutellum pale yellowish. Wings blackish-violaceous. Legs black. Abdomen black, with the third segment above pale yellowish. Beneath black. Length 7 lines.

One specimen. Utah. Dr. Suckley. (Coll. Smith. Inst.)

18. *B. Californicus*.

*Bombus Californicus* Smith, Brit. Mus. Catal. Hym. ii, 400. 57.

*Female*. “Black; the pubescence on the head black, that on the thorax before the wings fulvo-ochraceous, posteriorly and beneath black; the legs black; wings fuscous. Abdomen, the pubescence black, except that on the fourth segment, which is yellow. Length 10 lines.”

*Worker*. Same as female, except that the hairs on the head are yellow. Length 6 lines.

*Male*. “The pubescence as in the female, differing only in having that on the face yellow. Length 5—6 lines.”

*Hab.* California. (♂, Coll. Ent. Soc. Philad.) *Female* and *male* not seen. In the worker the hairs are rather long, and those of the third segment of the abdomen above cover the anterior part of the yellow of the fourth segment, giving the band of yellow on that segment the appearance of being very narrow.

19. *B. dubius* n. sp.

*Worker?* Head black. Thorax anteriorly pale yellowish; between

the wings black. Scutellum yellowish, mixed with black. Wings fuscous. Legs black. Abdomen above black, with the fourth segment yellowish-white. Beneath black. Length 7 lines.

One specimen. Western Kansas. (Coll. E. Norton.)

Closely allied to *B. Californicus*, but differs by the more elongate head, the yellowish scutellum, and in the scape of the antennæ being much shorter.

20. *B. occidentalis*.

*Bombus occidentalis* Greene, Ann. Lyc. Nat. Hist. N. Y., 7, p. 11 & 170.

*Female*. Head black, with a tuft of yellowish hairs below the antennæ. Thorax yellow anteriorly and laterally, with a broad black band between the wings. Scutellum yellowish, intermixed with black. Wings fusco-hyaline, nervures black. Legs black; tarsi brown; corbicula golden-yellow. Abdomen above with the first three segments black, the apical segments white. Beneath black, with the posterior margin of the fifth and sixth segments fringed with whitish hairs. Length 10 lines.

*Worker*. Colored same as the female. Length 7 lines.

*Male*. Colored same as the female, except that the hairs on the clypeus and vertex are mixed with yellowish, and those of the body beneath more or less pale. Length 7—8 lines.

Forty-two (2 ♀, 36 ♂, 4 ♂) specimens examined. California, Puget's Sound, Ft. Vancouver, (Coll. Ent. Soc. Phila., E. Norton, and Smith. Inst.)

A very pretty species, and seems to be the most common of our Western ones. The hairs of the body are rather long, and those on the third abdominal segment above cover the anterior half of the fourth segment.

21. *B. proximus*, n. sp.

*Worker?* Head black. Thorax anteriorly pale yellowish, posteriorly black mixed with yellowish. Wings subhyaline. Legs black; corbicula pale. Abdomen above black, with the third segment yellowish-white, and the two apical segments white. Beneath black, slightly mixed with pale hairs. Length 7 lines.

One specimen. Utah. Dr. Suckley. (Coll. Smith. Inst.)

Resembles *B. medius*, but the head is shorter, the body more compact, the wings clear, and the apical segments of the abdomen are white.



22. *B. modestus*, n. sp.

*Female.* Head black, slightly mixed with pale hairs on the vertex. Thorax before the wings yellowish-white; remainder black. Wings hyaline, faintly clouded on the apical margins. Legs black; inner side of the basal joint of posterior tarsi golden in certain lights. Abdomen above with the first, third and fourth (except the posterior margin) segments black; second yellowish-white; posterior margin of the fourth, and the remaining segments white. Beneath black. Length 7 lines.

One specimen. Youcon River, Arctic America. Mr. R. Kennicott. (Coll. Smith. Inst.)

23. *B. terricola*.

*Bombus terricola* Kirby, Faun. Bor. Am. iv, p. 273, Pl. 6 f. 4 ♀.

*Female.* Head black. Thorax with its anterior portion above bright yellow, remainder of the thorax black, except a slight admixture of yellow on the scutellum. Wings fusco-hyaline. Legs black; hairs of the posterior tibiæ and the tarsi pale brown. Abdomen with the first, fourth and fifth segments above black; second and third bright yellow; anus yellowish-white. Beneath black. Length  $9\frac{1}{2}$  lines.

*Worker.* Same as the female, except that the scutellum is altogether black, and the smaller size. Length 7 lines.

*Male.* Unknown to me.

Two specimens; Canada West, ♀ (Coll. Ent. Soc. Phila.), Hudson's Bay Territory, ♂ (Coll. Mr. E. Norton).

For the beautiful female specimen, the Society is indebted to Mr. William Saunders, of London, C. W.

24. *B. Howardii*, n. sp.

*Male.* Head black, mixed with yellow on the face and vertex. Thorax lemon-yellow above and beneath, with an indistinct blackish band between the wings. Wings hyaline, slightly stained with yellowish; nervures brown. Legs black, slightly yellowish on the base of the femora beneath; hairs of the tibiæ and tarsi pale brown. Abdomen with the first, anterior portion of the second, and the fourth segments above black; the posterior margin of the second and the whole of the third segments above lemon-yellow; the three apical segments very

pale yellow or a dirty white. Beneath black, sparsely clothed with pale hairs. Length  $8\frac{1}{2}$  lines.

*Female* and *worker* not seen.

One specimen. Pike's Peak. (Coll. Ent. Soc. Phila.) Collected by Mr. Winslow J. Howard, after whom it is named, and who has already discovered in that locality some new and very interesting species of Hymenoptera.

25. *B. frigidus*.

*Bombus frigidus* Smith, Brit. Mus. Cat. Hym. ii, p. 399. (1854).

*Bombus Carriei* Greene, Ann. Lyc. Nat. Hist. N. Y. vii, p. 170. (1860).

*Female*. Head black, mixed with yellowish on the vertex. Thorax yellow, with a black band between the wings. Wings fusco-hyaline. Legs black; base of femora beneath clothed with yellowish hairs; corbicula fulvous; tarsi brown, inner side of basal joint rufous. Abdomen above with the two basal segments yellow; the third black, and the remaining segments fulvous or yellowish-fulvous. Beneath black, mixed with a few pale hairs. Length 7—8 lines.

*Worker*. Colored same as the female. Length 5—6 lines.

*Male*. Colored same as the female, except that the hairs on the head and legs are all yellow. Length  $6\frac{1}{2}$  lines.

*Variety*. The black band on the third segment of the abdomen above is very indistinct.

Twenty (13 ♀, 4 ♂, 3 ♂) specimens examined. Great Slave Lake; Youcon River, Arctic America. Mr. Kennicott, (Coll. Smith. Inst.) Puget's Sound, (Coll. E. Norton).

The antennæ of the male of this species, unlike any other known to me, have the flagellum somewhat suddenly thickened at the base, and gradually narrows to the tip.

In some specimens the hairs of the third dorsal segment of the abdomen cover the anterior part of the fourth segment, giving the abdomen the appearance of having two black bands.

The variety of the male has the abdominal segments very much contracted, and the black band on the third segment is so indistinct that it would seem to belong to another species, but I think it is merely a variation.

The description of *B. Carriei* Greene, answers so well to that of *B. frigidus*, that I have no doubts of their identity.

26. *B. Kirbiellus*.

*Bombus Kirbiellus* Curtis, Ross' 2nd Voyage, Append. p. lxii.

"*Female*. Pl. A, fig. 2.—Black, a broad margin in front of the thorax, hinder margin of scutellum, and the abdomen, excepting the third segment and the apex, clothed with long yellow-ochreous hairs; wings yellowish, excepting the posterior margin, the nervures piceous; inside the tarsi with the pile bright ferruginous; tips of spurs, apical joint of tarsi, and base of claws sub-castaneous. Length 10 lines.

"*Neuter*. Similar to the female but much smaller, the hairs beyond the black on the abdomen are generally orange, and the whole of the tarsi, excepting the basal joint, is sub-castaneous. Length 7 lines.

"*Male*. Black, antennæ as long as the thorax, compressed at the apex; face and crown of head clothed with long yellow and black hairs; thorax yellow with hairs, having a transverse black band between the wings; basal half of abdomen yellow, the remainder orange, with a narrow black band across the middle; wings slightly yellow at the costa, the posterior margin slightly stained with brown, nervures piceous; basal joint of tarsi clothed inside with bright ferruginous hairs; spurs, base of claws, and apex of tarsi ochreous. Length  $7\frac{1}{2}$  lines."

Arctic America. Unknown to me.

27. *B. polaris*.

*Bombus polaris* Curtis, Ross' 2nd Voyage, Append. p. lxiii.

"*Female*. Black; a broad band across the anterior portion of the thorax, the scutellum, and abdomen clothed with long yellow hairs, whitish towards the apex of the abdomen, with a few black hairs on the sides of the third segment, a band of the same color on the fourth, and a very slight one on the fifth segment; tarsi clothed with black pile internally, the outside of the basal joints brownish, the edges ferruginous. Length 10 lines.

"*Male*. Black, clothed with yellow hairs; head black, with a patch of yellow hairs on the face, and another on the back of the head, a blackish band across the centre of the thorax, and an indistinct narrow one on the third and fourth segments of the abdomen, the apex orange; inside of tarsi clothed with yellowish pile. Length 6 lines.

"*Remarks*. A pair only of this species was preserved; in size and many respects it resembles *B. Kirbiellus*, but the indistinct and some-

what double band of black hairs across the abdomen will distinguish it, and the yellow pile inside of the tarsi in the male and the black in the female, are sufficient characters, I think, to justify its being separated from the former species."

Arctic America. Unknown to me. Probably a variety of the preceding species.

I have before me two male specimens from Methy Portage, Arctic America, (Coll. Smith. Inst.) which answer very well to the description above given. They are nearly 6 lines long, and in coloration they closely resemble the workers of *frigidus*, but differ very much from the males of that species.

28. *B. strenuus*, n. sp.

*Female*. Head black, mixed with dark fuscous on the vertex. Thorax anteriorly and laterally yellowish; a broad black band between the wings. Scutellum yellowish, somewhat mixed with black. Wings fusco-hyaline, darkest along the costa and towards the base. Legs black. Abdomen with the three basal segments yellowish; the fourth black, and the two apical segments more or less fulvous or yellowish-fulvous, mixed with black. Beneath black. Length 10—12 lines.

*Worker*. Not seen.

*Male*. Colored same as the female, except that the head has a mixture of yellowish below the antennæ and on the vertex; the legs have the hairs yellowish, particularly on the posterior pair; the fifth segment of the abdomen is nearly all black, and the two apical segments entirely fulvous. Length 7 lines.

Five (4 ♀, 1 ♂) specimens examined. Youcon River, Arctic America, and Hudson's Bay Territory. Mr. Kennicott. (Coll. Smith. Inst.)

A very fine species. Two of the female specimens have the two apical segments almost entirely black, and therefore this species may, although improbably, prove to be a variety of *B. Arcticus*.

29. *B. Sitkensis*.

*Bombus Sitkensis* Nyl. Notis. ur Sällsk. pro Faun. et Flor. Fenn. Förh. 1. p. 235. 19.

"Hairy, yellow; on the third and fourth segments of the abdomen blackish, with the hairs on the head and back of thorax mixed with blackish; corbicula either fuscous or inclining to fulvous. In the ♂,

the hairs are of a more pure yellow, with three, more or less distinct, narrow bands of the abdomen, and the hairs in the middle of the back of the thorax mixed with black.

“Small. ♀, 17 millim., anterior wings 14; ♂, 10—14, anterior wings 9—12; in this the black hairy band of the abdomen is often transversely divided by yellow hairs of the margin of the third segment; ♂, 12 millim., long, with the wings somewhat longer, hairs narrowly banded on the base of the third abdominal segment, on the fourth and fifth almost entirely black; anus fulvous-yellow. Feet black, hairy, in ♀ ♂, yellow hairy in ♂. Sitka.”

Not seen.

30. *B. affinis* n. sp.

*Female.* Head black. Thorax in front and on the sides yellow; between the wings black. Scutellum yellow. Wings fusco-hyaline. Legs black. Abdomen with the whole of the first and the sides and posterior margin of the second segments above yellow; remainder of the second segment rufo-fulvous; remaining segments black. Beneath black. Length 8 lines.

*Male.* Colored same as the female, except a slight admixture of yellowish hairs on the vertex. Length 8 lines.

*Hab.* Canada, ♀, Mr. W. Saunders. (Coll. Ent. Soc. Phila.), and New York, ♂. (Coll. E. Norton).

31. *B. melanopyge*.

*Bombus melanopyge* Nyl. Notis. ur Sällsk. pro Faun. et Flor. Fenn. Förh. 1. p. 236.

“Hairy, yellow, with the hairs on the head and the back of the thorax, between the wings subfasciate, intermixed with blackish; on the second, third and base of the fourth segments of the abdomen fulvo-rufous, on the following blackish; body beneath yellow hairy. Length of the body and anterior wings, 11 millim. Sitka.”

Not seen.

32. *B. lacustris*, n. sp.

*Female.* Head black, mixed with yellowish in front and on the vertex. Thorax anteriorly and laterally yellowish, mixed with blackish; between the wings blackish. Scutellum yellowish. Wings subhyaline, apical margins clouded. Legs black; base of femora yellowish

beneath; corbicula fuscous; tarsi brownish, inner side of the basal joint bright rufous. Abdomen above with the basal segment and the posterior margin of the fourth segment yellowish; the second and third segments reddish; remaining segments black. Beneath black, mixed with yellowish hairs. Length 8 lines.

*Worker.* Colored same as the female, except that the yellowish fringe on the fourth abdominal segment is not so conspicuous. Length  $6\frac{1}{2}$ —7 lines.

*Male.* Colored same as the female, except that the hairs of the head and the anterior part of the thorax are more yellowish, with a very slight mixture of black, and the black band between the wings much more distinct. Length  $6\frac{1}{2}$  lines.

Six (3 ♀, 2 ♂, 1 ♂) specimens examined: Lake Athabasca, and Great Slave Lake. Mr. R. Kennicott. (Coll. E. Norton and Smith. Inst.)

This is closely allied to *B. ternarius* and *ornatus*, but differs from both species.

### 33. *B. ornatus*.

*Bombus ornatus* Smith, Brit. Mus. Cat. Hym. ii, p. 398. 52.

“*Female.* Length 7 lines.—Black; the pubescence on the head black, mixed with yellow hairs at the insertion of the antennæ; the thorax has a rich fulvo-ochraceous pubescence, and has a broad black band between the wings, the sides of the thorax anteriorly yellow; the legs have a black pubescence, with a few pale hairs at the base of the femora beneath; wings fusco-hyaline. Abdomen, the pubescence on the basal segment yellow, on the three following segments it is fulvous, having a narrow border of yellow, which divides it from the black pubescence which clothes the apex.

“The coloring of the male and the worker is the same, but less bright, and the pubescence is longer in the male than in the other sexes.

“*Hab.* North America; Hudson’s Bay; Arctic America.”

Unknown to me. Very closely allied to *B. ternarius*.

### 34. *B. ternarius*.

*Bombus ternarius* Say, Bost. Jour. Nat. Hist. 1, p. 414.

*Bombus Huntii* Greene, Ann. Lyc. Nat. Hist. N. Y. 7, p. 172.

*Female.* Head black, more or less yellow on the face and vertex. Thorax with its anterior portion, sides, and the scutellum lemon-yellow;

a broad black band between the wings. Wings subhyaline, apical margin stained with brown. Legs black; base of femora beneath clothed with yellow hairs; tarsi brown. Abdomen with the first and fourth segments above lemon-yellow; second and third segments bright fulvous; the two apical segments black. Beneath black, intermixed with yellowish. Length 10 lines.

*Worker.* Same as the female, except size, and the colors are not so bright. Length 5—6 lines.

*Male.* Colored same as the female. Length 7 lines.

Sixteen (5 ♀, 10 ♂, 1 ♂) specimens examined. Me., Conn., Penn., Kansas, Utah, Puget's Sound, and Arctic America. (Coll. Ent. Soc. Phil. and E. Norton).

This is a beautiful species when fresh; in alcoholic specimens the yellow is faded to a dirty white, and the fulvous color becomes more of a reddish hue. I see no reason why *B. Huntii* Greene, should be separated from this species, the colors are situated exactly the same, although faded by alcoholic immersion; and if the abdominal segments were not unnaturally distended, the entire length of the insect would not exceed 10 lines.

35. *B. flavifrons* n. sp.

*Female.* Head yellow in front and on the vertex. Thorax yellowish, mixed with blackish above, with a blackish band between the wings. Wings subhyaline, slightly stained with fuscous. Legs black, with pale hairs; femora beneath densely clothed with yellowish hairs; inner side of the basal joint of tarsi golden yellow in certain lights. Abdomen with the two basal segments above yellowish; the third and fourth fulvous; the remaining segments blackish. Beneath black, clothed with yellowish hairs. Length 8 lines.

*Worker.* Colored same as the female, except that the band between the wings is much more distinct, the color of the third and fourth segments of the abdomen above is more reddish, and the black color of the apical segments somewhat mixed with reddish. Length  $5\frac{1}{2}$  lines.

*Male.* Resembles the female, but the hairs are somewhat longer, and those on the face more dense; the color of the third and fourth segments of the abdomen above same as that of the worker; the legs and the abdomen beneath are thickly clothed with yellowish hairs. In

one specimen the base of the third segment of the abdomen above is mixed with black. Length 7 lines.

Eleven (3 ♀, 1 ♂, 7 ♂) specimens examined. Ft. Youcon, Arctic America; Hudson's Bay Territory, and Kansas. (Coll. Ent. Soc. Phil. E. Norton, and Smith. Inst.)

The black color on the apical segments of the abdomen of the worker, being mixed with red, would seem to connect it with *B. praticola* of Kirby, which I have not identified, but, for the present, it would probably be better to keep them separated.

36. *B. praticola*.

*Bombus praticola* Kirby, Faun. Bor. Am. 4, p. 274.

"*Female*. Body black, clothed above with yellowish hairs. Head with a tuft of yellowish hairs below the antennæ, and on the vertex; thorax black between the wings, which are embrowned; legs with yellow hairs at the base; anterior half of the abdomen yellow, posterior ferruginous. Length of the body 7 lines."

British America. Unknown to me.

37. *B. sylvicola*.

*Bombus sylvicola* Kirby, Faun. Bor. Amer. 4, p. 272.

*Female*. Head black; the vertex and a tuft of hairs below the insertion of the antennæ, yellowish. Thorax yellowish, with a broad black band between the wings. Wings subhyaline, varied with fuscous. Legs black; femora beneath with yellowish hairs. Abdomen above yellowish, with the second and third segments reddish. Beneath black, mixed with pale hairs. Length 8—9 lines.

*Worker* and *male* not seen.

Four specimens. Youcon River, Arctic America, and Great Slave Lake. Mr. R. Kennicott. (Coll. Smith. Inst.)

I take the specimens before me to be the same species as described by Mr. Kirby, under the above name, although he does not mention the position of the reddish bands on the abdomen. His description was taken from a single specimen (sex not mentioned) captured in Lat. 65°.

38. *B. rufo-cinctus* n. sp.

*Male*. Head black, hairs on the vertex and a tuft in front below the antennæ yellow. Thorax yellow, with an indistinct band between



the wings. Wings hyaline, slightly clouded on the apical margins. Legs black, femora clothed beneath with yellowish hairs. Abdomen with the third and fourth segments above reddish, remaining segments yellow. Beneath sparsely clothed with yellowish hairs. Length 7 lines.

*Worker.* Colored same as the male, except that the hairs of the face are black. Length 5 lines.

*Female.* Not seen.

Two specimens from Pike's Peak (Coll. Ent. Soc. Phila.), collected by Mr. W. J. Howard.

39. *B. nidulans.*

*Apis nidulans* Fabr. Ent. Syst. Suppl. 274.

*Bombus nidulans* Fabr. Syst. Piez. 349.

"Head and antennæ rather long. Thorax yellow, a black band between the wings. Abdomen yellow, anus slightly fulvous. Feet black. *Hab.* North America."

Unknown to me. Probably an *Apathus*, and may be a variety of *A. elatus*.

40. *B. Antiguensis.* ✓

*Apis Antiguensis* Fab. Syst. Ent. p. 380; Ent. Syst. 2, p. 318; Oliv. Encycl. Méth. Ins. iv, p. 66.

*Bombus Antiguensis* Fabr. Syst. Piez. p. 346.

"Size of *A. violaceus*. Head black, immaculate. Thorax hairy, black. Abdomen black, anterior part yellow. Wings fuscous. Feet black. *Hab.* Antigua."

Unknown to me.

41. *B. ephippiatus.* ✓

*Bombus ephippiatus* Say, Bost. Journ. Nat. Hist. 1. p. 414.

"Body black; pleura pale yellow; wings dusky, tinged with violaceous; tergum pale yellow towards the base; this color is gradually narrowed behind and terminately on the third segment, forming somewhat of a semi-oval, with its base to the thorax and confluent with the color of the pleura. Length less than half an inch.

"Inhabits Mexico."

Not seen.

42. *B. pulcher* n. sp. ✓

*Female.* Head black. Thorax above black, lemon-yellow on the sides. Wings fusco-hyaline, slightly tinged with violaceous. Legs black. Abdomen with the first, part of the second, and centre of the third segments above bright lemon-yellow; balance of the second and third segments above bright rufous; remaining segments black. Beneath black. Length 11 lines.

*Hab.* Jalapa, Mexico. Mr. J. Akhurst. (Coll. E. Norton.)

This is the handsomest species of *Bombus* known to me, and were it not for the rufous color on the second and third segments of the abdomen, which is very conspicuous, I should have considered it as the *B. ephippiatus* of Say, but he mentions no such color in his description.

43. *B. Carolinus.* ✓

*Apis Carolina* Linn. Syst. Nat. 2, p. 959; Fabr. Syst. Ent. p. 379; Ent. Syst. 2, p. 316; Oliv. Encyc. Méth. Ins. iv, 64.

*Bombus Carolinus* Fabr. Syst. Piez. p. 342.

“Hairy, black; abdomen above fulvous, the first and last segments black. *Hab.* North America.”

Unknown to me.

44. *B. violaceus.* ✓

*Bombus violaceus* St. Farg. Hym. 1, p. 473.

“Black. Feet black; hairs of the under part of the tibiæ and tarsi rufous. Wings fuscous, with a violet reflection. *Female.* Length 13 lines. *Worker,* like the female. Length from 5 to 7 lines. North America.”

I have not seen this species, and doubt very much that it occurs in North America. The British Museum have specimens of it from South America.

In addition to the species above described, the following European species have been mentioned as found in North America:—

*B. hortorum* Linn. Smith, Entom. Annual, 1857, p. 30. Lake Winnepeg.

*B. Derhamellus* Kirby, Faun. Bor.-Amer. 4, p. 273. Arctic America.

*B. hyperboreus* Dahlb. Schiödte, in Etzel's Grönland, p. 611. Greenland.

*B. balteatus* Dahlb. Schiödte, = *Kirtellus* “ ”

In the collection of Mr. Norton, there is a single specimen, a worker, collected in New Jersey, by Mr. J. Akhurst, which answers so well to the description given by Mr. Smith of that sex of *B. pratorum*, a European species, that I do not feel justified in separating them.

## ADDITIONS.

The preceding page had not been printed more than twelve hours before I received a copy of the June number of the "Journal of Entomology," for 1861, in which I find a paper by Mr. Frederick Smith, describing several North American species of *Bombus* and *Apathus*. This being the first opportunity that I have had of examining the above number of that valuable publication, the omissions, &c., are consequently unavoidable, and although unfortunate, yet I am glad of the opportunity of having the additions made, before the printing of my paper has been finished and copies distributed.

The three following species of *Bombus*, all of which are unknown to me, must be added to the foregoing list; those of *Apathus* will be found hereafter under that genus.

21.—22. *B. modestus*.

*Bombus modestus* Smith, Journal of Entomology, i, p. 153.

"*Female*. Length 9 lines. Black, pubescent; the clypeus very smooth, shining, and delicately punctured. Thorax: the pubescence above before the wings yellow; the scutellum with a slight admixture of fulvous hairs; the wings subhyaline; the pubescence on the legs black, that on the basal joint of the posterior tarsi within ferruginous, the claw-joint of the tarsi obscurely ferruginous. Abdomen: the third and fourth segments clothed with yellow pubescence, the fifth with black, and fringed on its apical margin with yellow hairs, the apical segment has also a thin clothing of hair of the same color.

"*Worker*. Length  $5\frac{1}{2}$  lines. The pubescence similarly disposed to that of the female, but paler, that on the apical segments white.

"*Hab*. Oajaca, Mexico. In the Collection of the British Museum."

22. The name *modestus*, used for the new species of this number, on p. 99, being preoccupied by Mr. Smith, should be changed to *moderatus*.

42.—43. *B. laboriosus*.

*Bombus laboriosus* Smith, Journal of Entomology, i, p. 153.

"*Female*. Length 8 lines. Black, pubescent; the head entirely

black, with the clypeus very smooth and shining, and delicately punctured. The thorax with black pubescence above and beneath, that on the sides pale yellow; the pubescence on the legs entirely black; the wings fusco-hyaline, the nervures black. Abdomen: the three basal segments clothed with pubescence of a pale yellow, somewhat lemon-colored; that on the third segment not quite extending to the lateral margins; the apical segment thinly sprinkled with ferruginous hairs.

“*Worker*. Length 5 lines. Colored like the female.

“*Hab*. Oajaca, Mexico. In the Collection of the British Museum.”

43.—44. *B. diligens*.

*Bombus diligens* Smith, Journal of Entomology, i, p. 154.

“*Female*. Length 10 lines. Black, and clothed with black pubescence; wings dark brown, shining. The pubescence on the thorax short and dense, except on the disk above, which is smooth and shining; the three apical segments clothed with ferruginous pubescence, the apical segment smooth and shining in the middle.

“*Hab*. Oajaca, Mexico. In the Collection of the British Museum.”

Gen. **APATHUS** Newm.

*Apathus* Newm. Ent. Mag. ii, p. 404 (1834).

*Psithyrus* St. Farg. Ann. Soc. Ent. Fr. i, p. 366 (1832); Hym. ii, p. 424 (1841);  
nec. *Hubner*.

This genus is parasitic on that of *Bombus*, and resembles it very much in general appearance. The characters with which to distinguish it from *Bombus*, are as follows:—The posterior tibiæ are destitute of corbiculæ, and are convex exteriorly; the basal joint of the posterior tarsi has no tooth at its base above. In the *female* the apex of the abdomen curves under, and the apical segment beneath has the lateral margins elevated. The mandibles have a single notch, while those of *Bombus* are distinctly toothed. This genus has no workers.

The males may be distinguished from those of *Bombus* by the posterior tibiæ being exteriorly convex and thickly coated with short hairs. The males of the latter genus have the exterior surface of the posterior tibiæ concave in the centre, with a few scattered hairs, and are fringed at the exterior margins.

Nothing is yet known of the economy of our species, and so far only a few have turned up. An examination of the nests of *Bombus* will doubtless bring more species to light. The following are all the species that have been identified.

1. *A. laboriosus*.

*Bombus laboriosus* Fabr. Syst. Piez. p. 352.

*Female*. Head black, pale yellowish on the vertex. Thorax above and on the sides pale greyish-yellow. Wings subhyaline, stained with yellowish. Legs black. Abdomen shining black; sparsely hairy on the disk; sides of the third segment slightly mixed with yellowish. Beneath black. Length 10 lines.

*Male*. Not seen.

Two specimens. Canada (Coll. Ent. Soc. Phila.) and Connecticut. (Coll. E. Norton.)

There is no doubt that this is the same species as described by Fabricius under the above name, although he does not mention the mixture of yellowish hairs on the sides of the third abdominal segment, which is quite plain in the two specimens before me.

2. *A. intrudens*.

*Apathus intrudens* Smith, Journal of Entomology, i, p. 154.

*Female*. Black: a tuft on the vertex and another in front of the anterior stemma pale yellow; the thorax clothed above with pale pubescence, which is continued down the sides in front of the tegulæ; the thorax smooth and shining behind the scutellum; the legs with very short black pubescence; the wings fusco-hyaline. Abdomen nearly naked, shining, incurved and very acute at the apex, the margins of the segments thinly fringed with black pubescence.

*Hab.* Oajaca, Mexico. In the British Museum Collection."

Unknown to me.

3. *A. fraternus*.

*Apathus fraternus* Smith, Brit. Mus. Cat. Hym. ii, 385.

*Male*. Length 10 lines.—Black; the face below the insertion of the antennæ densely covered with dark fuscous pubescence; the flagellum very slender, the joints subarcuate; on the vertex the pubescence is mixed with fulvous. Thorax clothed with short fulvo-ochraceous

pubescence, on the middle of the disk it is black; the wings fuscous, darkest towards their base; the legs clothed with short dark fuscous pubescence. Abdomen elongate, narrowed towards the apex; the two basal segments clothed with short fulvo-ochraceous, and the apical segments with short black pubescence."

*Female.* Not seen.

One specimen. New Wied, Texas. (Coll. Smith. Inst.)

4. *A. contiguus* n. sp.

*Male.* Head black, yellowish on the vertex. Thorax lemon-yellow, more or less black between the wings. Wings fusco-hyaline. Legs black, tarsi pale, inner side of the basal joint rufous. Abdomen with the first two segments above lemon-yellow; rest black. Beneath black. Length 7—8 lines.

*Variety.* The anterior portion of the second abdominal segment above mixed with black, especially on the sides.

*Female.* Not seen.

Four specimens. Conn., Penn., Del. (Coll. E. Norton, and Ent. Soc. Philad.)

This species closely resembles *Bombus vagans* Smith, and probably parasitic on that species.

5. *A. citrinus*.

*Apathus citrinus* Smith, Brit. Mus. Cat. Hym. ii. 335.

*Male.* Head black, slightly mixed with yellowish on the vertex. Thorax pale lemon or greyish-yellow above and on the sides, more or less mixed with black between the wings. Wings subhyaline, stained with fuscous along the nervures. Legs black, tarsi pale, inner side of the basal joint golden in certain lights. Abdomen with the first three segments above pale lemon or greyish-yellow; remaining segments black. Beneath black. Length about 7 lines.

*Variety?* The yellowish hairs of the body much deeper in color, the wings darker, the fourth segment of the abdomen above mixed with yellowish and the hairs of the tarsi reddish. Length 6 lines.

*Female.* Not seen.

Six specimens. Mass., Conn., N. Y., Ill. (Coll. E. Norton, and Ent. Soc. Phila.)

The *variety* may be a distinct species, but there being only a single

specimen. I do not care to make a new species of it, until more have been accumulated.

6. *A. insularis*.

*Bombus interruptus* Greene, Ann. Lyc. Nat. Hist. N. Y., vii, p. 11 & 173. ♀.

(nec *Psithyrus* St. Farg.)

*Bombus Suckleyi* Greene, " " " 168. ♂.

*Apathus insularis* Smith, Journal of Entomology, i, p. 155, ♀.

*Female*. Head black, with the hairs at the insertion of the antennæ and on the vertex, yellow. Thorax yellow above and on the sides; black between the wings. Wings fusco-hyaline. Legs black; femora tinged with dark red; tarsi pale. Abdomen above shining black, with the sides of the third, fourth and fifth segments yellow. Beneath black. Length about 10 lines.

*Male*. Head black, mixed with yellow on the vertex. Thorax above and on the sides yellow; black between the wings. Wings subhyaline. Legs black; tarsi pale. Abdomen above with the second, third (or its anterior part), and the middle of the three apical segments black; rest yellowish. Beneath black, mixed with pale hairs. Length 7—8 lines.

*Var. a.* Having the second and third abdominal segments mixed with yellow on the disk; anus black. Length 8 lines.—*B. Suckleyi* Greene.

*Var. b.* Having the first three and sides of the fourth and fifth abdominal segments yellow; rest black. Length  $6\frac{1}{2}$  lines.

*Var. c.* Having a distinct black band between the wings; the second abdominal segment mixed with yellow on the disk; the fifth segment entirely black, and the apical segment mixed with pale fulvous. Length  $6\frac{1}{2}$  lines.

Fifteen (4 ♀, 11 ♂) specimens examined. Methy Portage, Arctic America; Puget's Sound; Ft. Steilacoom, W. T.; Vancouver's Island. (Coll. E. Norton and Smith. Inst.)

The female of this species so much resembles that of *A. campestris* of Europe, that, at first, I thought they were the same species, and am still doubtful whether the differences are sufficient to separate them; but until a more critical examination and comparison of the two species can be made, they had better be kept separated. The name *interruptus* having been used by St. Fargeau for a species of this genus, the name proposed by Mr. Smith should take its place.

The female specimens from which Mr. Greene made his description of this species, have the hairs on the dorsal surface of the abdomen rubbed off, although, generally, the hairs on that part of the abdomen are much scattered and sparse.

The only differences that I can see between the females of this species, and *campestris*, are that the former species has the hairs of the head yellowish, while those on the head of the latter species are entirely black; the black band in the middle of the thorax of *campestris* is broader and more distinct.

The males above described, and which I think belong to this species, present no characters by which they could easily be separated from those of *campestris*, and they vary just as much in the coloration.

The specimen, before me, of *B. Suckleyi* Greene, which seems to be the typical specimen (as it has the word "Type" attached to the pin), is a ♂, and not a ♀, as indicated in Mr. G's description, and the apical segment is apparently altogether black, and not yellowish. However, in considering the many variations which occur in the males of *A. campestris*, I am inclined to believe that this is the male of *A. insularis*, as well as the other two varieties described above.

*Var. c.*, of the male, answers in many particulars to the description given of the male of *B. Sitkensis*, but as it seems more related as a variety of *A. insularis*, it would probably be best to allow it to remain here, until more specimens have been accumulated. It is certainly an *Apathus*.

#### 7. *A. elatus*.

*Apis alata* Fabr. Ent. Syst. Suppl. p. 274.

*Bombus elatus* Fabr. Syst. Piez. p. 352.

*Male*. Head black, sometimes mixed with whitish on the clypeus. Thorax lemon-yellow with a black band between the wings. Wings fusco-hyaline. Legs black, more or less whitish on the femora; inner side of the posterior tibiæ and basal joint of tarsi golden-rufous in certain lights. Abdomen bright-lemon yellow, except the two apical segments, which are tufted with black. Beneath black, mixed with yellowish on the sides. Length 7—10 lines.

*Var. a.* Having the hairs on the fifth abdominal segment mixed with black, and the tufts on the anus tinged with fulvous.



*Var. b.* Having all the abdominal segments yellowish, except the anus, which is black.

*Var. c.* Having the whole of the thorax black, except the anterior portion above, and a few hairs on the scutellum which are yellowish.

*Var. d.* Having the whole of the thorax yellowish, except a slight admixture of blackish between the wings.

*Female.* Not seen.

Twenty-two specimens examined. Mass., Conn., N. Y., N. J., Penn., Del., Md., Ill. (Coll. E. Norton, and Ent. Soc. Phila.)

Although Fabricius described this species as having the thorax entirely yellow, it will be seen above that it varies from almost all yellow to almost all black. The most common variety, however, has a black band between the wings. The yellowish color of this species, as is generally the case with most of the bees, often fades to a dirty white; the color when fresh is doubtless a bright lemon-yellow.

It may be possible that *B. nidulans* of Fab., is only a variety of this species, as some of the specimens before me have the anus tinged with fulvous.

This species resembles *Bombus fervidus* very much in coloration, and may possibly be parasitic on that species.

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In concluding this paper I would state that I have done the best I could in separating the species of this group, and it may be that I have made too many new species, but when we consider the great difficulty experienced by authors in bringing about a correct division of the European species, it will perhaps be a sufficient excuse for any such errors that I have made in this paper.

I desire, here, to express my thanks to Mr. Edward Norton, Dr. Thos. B. Wilson, and the Smithsonian Institution, for the loan of specimens, and for much valuable assistance.

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